MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2014/2015 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN MATHEMATICS

SMA 191: INTRODUCTION TO COMPUTER PROGRAMMING

Date: 8/4/ 2015 **Time: 8:30 – 10:30 AM**

Section A (30 Marks)

Question 1

a) Explain the term algorithm as used in computer programming (2 marks)

b) Based on the Polya problem solving method, explain the seven-step problem solving method used in computer programming (14 marks)

c) with the aid of a diagram, explain the term break-out diagram as used computer programming (4 marks)

d) Explain any **five** ways in which algorithms can be represented in computer programming (10 marks)

Section B (40 Marks)

QUESTION TWO (20 MARKS)

a) i) Describe the Top Down problem solving technique used in programming. (1 mark)

ii) Citing an example in each case explain **three** design tools used in Top-down technique. (6 marks)

b) Write C language statements that could be used to carry out each of the following
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i) Declare a constant called 'item' storing an integer value 10
ii)Declare an array called 'student' for holding a maximum of 20 character values
iii)Increment the value of x by 3 (3 marks)

c) Write a C language program to manage details of a salesman based on the following.

Total Sales	Commission (%)
0 – 10,000	5
Above 10,000 up to 50,000	7
Above 50,000	8

The program should be able to:

ι) Input sales
ιι) Compute total sales
ιιι) Compute commission based on the above (10 marks)

QUESTION THREE (20 MARKS)

a) Name and explain any **two** types of testing techniques used in software engineering (4 marks)

b) Using the example of a generalized pay algorithm that calculates weekly pay as being 40 hours a week x 500 Ksh pay per hour, Explain any four processes that are used in modifying algorithms to make them more powerful, more useful, more convenient, more efficient, or more foolproof. (10 marks)

c) Implement in C language programming the algorithm in B above given that the pay is incremented by 1.5 times the hourly rate for first 20 hours of overtime and 2 times the hourly rate for every additonal overtime hours after those 20 hours. (6 marks)

QUESTION FOUR (20 MARKS)

a) i)Define the term system software. (2 marks)

ii)Describe **two** classes of system software. (4 marks)
iii)For each of the classes described in (ii) list the tasks that may be handled. (4 marks)

b) Write a C language program that reads two numbers through the keyboard. The program checks whether the number entered is greater than 10. If the number is less than 10, the user is prompted to enter another number, if the two numbers are greater than 10. The program then computes and outputs their sum. (10 marks)

QUESTION FIVE (20 MARKS)

a) List and explain, while noting their lifecycles, any **two** common sizes of computer programs (4 marks)

b) Explain the **four** properties that an algorithm must possess to be considered complete and precise (8 marks)

c) Name and explain the **four** basic building blocks forms for flowcharts. (8 marks)